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VERIFICATION OF TRANSLATION

Assistant Commissioner for Patents
Washington, DC 20231

Sir:

I, Jeffrey D. Tekanic, am employed by Kramer Barske Schmidtchen of Radeckestrasse 43, Munich 91245, Germany, and declare that:

1) I am conversant in both German and English;

2) I have prepared the English translation of International Application No. PCT/DE2004/01472 and, to the best of my knowledge and belief, the English translation is a true and accurate translation of the substance of the above-identified International Application; and

3) all statements made of my own knowledge are true and all statements made on information and belief are believed to be true, and further these statements are made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 USC 1001, and such false statements may jeopardize the validity of the application or any patent issuing thereon.

11 January 2006
Date

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TARGA ROOF SYSTEM FOR A VEHICLE AND VEHICLE

[0001] The invention relates to a Targa roof system for a vehicle, as well as a vehicle equipped with a Targa roof system.

[0002] Targa roof systems form an intermediate solution between sun roofs and full convertibles. In sun roofs, merely a part of the roof is movable into another part, so that an opening results within the roof over the passenger compartment. In convertibles, the entire roof area, including the rear window, is openable from the upper side of the windshield frame towards the rear. In a Targa roof, a roof part is removable, which roof part is disposed between the upper side of a windshield and/or the windshield frame and a traverse cross beam that spans across the vehicle inner compartment and is spaced from the windshield and/or windshield frame, wherein this roof part is, generally speaking, relatively flat, so that it is stowable under the rear trunk lid or in the vehicle inner compartment, e.g., behind the driver/passenger seat.

[0003] A vehicle roof is known from DE 100 32 378 C2 that concerns the functionality of a convertible roof, in which a forward roof part and a rear roof part, which includes a rear window, are movably borne on the vehicle body and are storable in a storage compartment behind the driver/passenger seat. The forward roof part is borne by means of a pivot bearing device that is slidably borne on a guide device that is affixed to the vehicle body; the pivot bearing device moves along the guide device when opening and storing the forward roof part, whereby the forward roof part lowers into the roof storage compartment. The pivot bearing device is constructed as a multi-hinge mechanism that is, as a whole, slidably borne on the guide device. A peculiarity of the known vehicle roof is its relatively complicated design. Furthermore, the roof part must be carefully guided by hand during its lowering, because it is pivotable relative to the vehicle body-affixed guide device due to the multi-hinge mechanism and thus can be scratched when it is not carefully handled.

[0004] A Targa roof system is described in DE 101 26 974 C1, in which a roof part is movable from a closed position covering the vehicle inner compartment into a storage position, wherein the movement is guided by a sliding device. The sliding device comprises a forward guide rail and a rear guide rail on each side of the vehicle; the roof part is slidably and pivotably borne on the sliding device and is movable into the roof storage compartment. The roof part is pivotably borne on the rear guide rails by means of a rotary-slide bearing and

on the forward guide rails by means of respective intermediate hinge devices, which are borne on the forward guide rail and are connected with the roof part at a forward rotary-hinge.

[0005] The object underlying the invention is to create a Targa roof system for a vehicle that is simply and conveniently manageable by its construction.

[0006] This object is solved with the features of claim 1.

[0007] By the use of the inventively-provided guide elements fixedly affixed on both sides of the roof part at its rear area with a spacing therebetween, it is achieved that the roof part is not pivotable relative to the guide rails during its lowering along guide rails, so that it can be securely and conveniently lowered and stowed.

[0008] Dependent claims 2 to 6 are directed to advantageous further developments and embodiments of the inventive Targa roof system.

[0009] Claims 7 and 8 denote a vehicle equipped with an inventive Targa roof system.

[0010] (following original description, starting at page 3)

[0011] Claims 7 and 8 denote a vehicle equipped with an inventive Targa roof system.

[0012] The invention will be elucidated in the following with the help of exemplary schematic drawings and with further details.

[0013] The drawings show:

[0014] Fig. 1 a side view, partly in section, of an inventive Targa roof system,

[0015] Fig. 2 a cut-out from Fig. 1 with a raised roof part,

[0016] Fig. 3-6 detailed views of Fig. 1 in different positions of the roof part,

[0017] Fig. 7 a view similar to Fig. 1 of a fully-raised roof part,

[0018] Fig. 8 the view of Fig. 7 of a half-lowered roof part,

[0019] Fig. 9 the view of Fig. 7 of a fully-lowered roof part,

[0020] Fig. 10 the view of Fig. 9 of a fully-lowered roof part pivoted into a storage position and

[0021] Fig. 11 a detailed view of Fig. 10.

[0022] According to Fig. 1, which shows a schematic side view, partly in section, of a detail of a cut-out of a vehicle equipped with a Targa roof system, a not-visible windshield is held in a windshield frame, whose left side pillar 2 and whose upper cross member 4 are visible.

[0023] A traverse cross beam 8 is affixed to the vehicle body and is arranged in the area of the back rest 6, or behind the back rest 6, of a driver- and passenger-seat; the traverse cross beam 6 generally forms a structural component of the vehicle body.

[0024] A flat roof part 10 extends from the cross member 4 of the windshield frame to the traverse cross beam 8, which the sides of the flat roof part 10 abut respective longitudinal cross beams 12; the traverse cross beams 12 connect the side pillars 2 and/or the cross member 4 with the traverse cross beam 8.

[0025] In its middle area, the forward area of the roof part 10 is formed as transparent area 14, e.g., from laminated glass or Plexiglas. For shading the transparent area 14, a slide panel 16 is movable within the roof part 10 in a known manner.

[0026] For latching the roof part 10 on the vehicle, a latching mechanism, e.g. operable by a single grip 17, is provided in a known manner; the latching mechanism latches the roof part 10 to the cross member 4, as well as, if necessary, to the traverse cross beam 8 and the longitudinal cross beam 12.

[0027] A bracket 18 is fixedly attached on both sides of the rear area of the roof part 12; each bracket 18 comprises a forward guide element 20 and a rear guide element 22, which are spaced somewhat from each other in the longitudinal direction of the vehicle and/or in the width direction of the roof part 10.

[0028] The rear guide element 22 projects into a guide rail 24; the guide rail 24 is pivotably guided at hinge 27 [*sic*, 28] in the vehicle inner compartment on both sides of the vehicle body close to the vehicle body floor 26. The forward guide element 20 is designed as a slide block that is, in the position shown in Fig. 1, non-slidably held by means of a latch 30 on a rail piece 32; the rail piece 32 is pivotable affixed on the longitudinal cross beam 12 so as to pivot about an axis 34 (for more detailed illustration, see Fig. 3 to 6).

[0029] Figure 2 shows a cut-out of the assembly according to Fig. 1, in which the latch has been released by means of the grip 17 and the roof part 10 has been upwardly tilted. As is apparent, the roof part 10 is upwardly tilted about the axis 34. When upwardly tilting the roof part about the axis 34, the rail piece 32, which is borne on the longitudinal cross beam 12, pivots in the clockwise direction together with the slide block-shaped guide element 20, which is affixed to the bracket and latched to the longitudinal cross beam 12. As a result, the guide element 22 slides in the guide rail 24 with simultaneous pivoting of the guide rail in the counter-clockwise direction about the hinge 27 [*sic*, 28], until the guide rail 24 comes into abutment with a stopper part 36 that projects from the rail piece 32.

[0030] Fig. 3 more precisely shows the construction of the bracket 18 with the guide elements 20 and 22. The roof part 10 is in its closed position.

[0031] The guide element 22 is slidably accommodated within the guide rail 24, wherein a retaining device therefor, so that the guide element 22 is not movable out of the guide rail 24 towards the top, is not required, because the upward movability of the roof part 10 is limited by its abutment on the inner side of the traverse cross beam 8.

[0032] Fig. 4 shows the roof part 10 approximately in the position shown in Fig 2, however in enlarged scale. As is apparent, the roof part 10 is already somewhat lowered, so that the guide element 22 has moved downwards in the guide rail 24 and the guide rail 24 is pivoted in the counter-clockwise direction.

[0033] Fig. 5 shows the assembly according to Fig. 4 in a further upwardly-tilted position of the roof part 10, wherein in the position shown in Fig. 5 the stopper part 30 [*sic*, 36] abuts on the guide rail 24, so that the guide rail 24 is brought into line with the rail piece 32 and further upward tilting of the roof part 14 [*sic*, 10] is not possible. In this state, the rail piece 32 is latched with the guide rail 24 by means of the latch 30 and simultaneously the slideability of the guide element 20 on the guide rail 32 [*sic*, 24] is enabled, so that the latch [*sic*, guide] element 20 can move away from the rail piece 32 and into the guide rail 24.

[0034] Starting from the state, in which the rail piece 32 is latched with the guide rail 24, the roof part 10 can not be further tilted relative to the guide rail 24, because it is held, secured from tilting, above the guide elements 20 and 22. The roof part 14 [*sic*, 10] can now be lowered in a well-defined manner along the guide rail from the position shown in Fig. 7 to the position shown in Fig. 8, until the guide element 22 abuts on an abutment on the lower end of the guide rail (Fig. 9). In this stowed position, the roof part 10 has moved to underneath the traverse cross beam 8 in the vehicle inner compartment, so that it can be tilted, together with the guide rail 24, in the clockwise direction about its hinge 28 (detailed view in Fig. 11) into an abutment position shown in Fig. 10; in this abutment position, the compartment behind the back rest 6 is only minimally narrowed by the roof part 14 [*sic*, 10].

[0035] The latching of the position of the guide rails between the rail piece 32 and the guide rail 24 can be automatically released when the roof part arrives in its stowed position shown in Fig. 9 or can be manually de-latchable.

[0036] The abutment position shown in Fig. 10 can be latched via the grip 16 [*sic*, 17] provided on the roof part, which is conveniently accessible. In this latching process, pins can extend laterally out of the roof part and engage in corresponding recesses in the traverse cross beam 8. In the alternative, the latching can also take place with the latch 30.

[0037] When the roof part is located in the abutment position shown in Fig. 10, the longitudinal cross beam 12 can be taken out, so that the space over the passenger compartment is bounded only by the windshield cross member 4 and the traverse cross beam 8.

[0038] When the roof part 14 [*sic*, 10] is located in the abutment position shown in Fig. 10, the view towards the rear in the middle area of the inner compartment is possible due to the transparent area 14 of the roof part 10, so that the view towards the rear through a not-shown rear window accommodated in the traverse cross beam 8 and through the roof part 10 is not restricted. In particular, the view through an inside rearview mirror towards the rear is not restricted.

[0039] For closing the roof, the processes are performed in the reverse sequence. The side cross beams 12 are reinserted. The roof part is pivoted forwardly together with the guide rail from the abutment position shown in Fig. 10 into the stowed position shown in Fig. 9, wherein the end position is again locked by latching between the rail piece 32 and the guide rail 24. The roof part 10 is then upwardly shifted into the position shown in Fig. 6, wherein the movement of the roof part is guided by the guide rails 24 and tilting takes place and the roof part can be, when it is fully raised into the position shown in Fig. 5, pivoted forwardly by further raising and is latched in the closed position.

[0040] The described apparatus can be modified in many ways.

[0041] For example, the guide elements 20 and 22 can be formed solely by two lateral pins fixedly attached to the bracket 18, wherein the rear pin (guide element 22) is continuously accommodated in the guide rail 24, and the forward pin (guide element 20) is accommodated in a guide groove, which guide groove is formed in the longitudinal cross beam 12, such that the forward guide pin is only movable out of the guide groove when it is aligned in the direction of the guide rail 24 according to Fig. 5. The stopper part 36 can then be directly formed by a wall of the groove. In this case, the guide piece borne on the longitudinal cross beam can be omitted.

[0042] For the individual latches, various automatic devices operated via an end switch or manually-operated devices are useable.

[0043] In one modified embodiment, the upper end of the guide rail 24 can be formed, such that the guide element 22 comes free from the guide rail 24 in the position shown in Fig. 3, so that the guide rail 24 is pivotable in the clockwise direction further rearwardly into a position, in which it is accommodated as far rearward as possible in the traverse cross beam 8.

[0044] In a simplified embodiment, the guide rails 24 are not pivotable. The guide element 22 attached to the roof is latched in the guide rail 24 in its uppermost position and forms a hinge, about which the roof part 10 is upwardly pivotable. As such, the guide element 20 moves upwardly out of a guide groove of the longitudinal cross beam 12 and is subsequently lowerable together with the guide element 22, wherein it is inserted from above into the guide rail 24. Also in such a simplified embodiment, in which design freedom is limited by the form of the junction between the rear end of the roof part 10 and traverse cross beam 8, a tilt-free lowering of the roof part 10 is possible. In such an embodiment, the traverse cross beam 8 can be partially opened in order to create space for the roof part that travels rearwardly during upward tilting.

[0045] The longitudinal cross beams 12 can be integral components of the roof part 10. The guide elements 20 then first begin to function when they are moved into the guide rails 24 after upward tilting of the roof part 10. As a whole, a Targa roof is created with the invention that is movable out of the closed position into the stowed position merely by operation of the grip 17 and vice versa, wherein for this purpose merely one hand is required.

Reference Number List

2	Side Pillar
4	Cross Member
6	Backrest
8	Traverse Cross Beam
10	Roof Part
12	Longitudinal Cross Beam
14	Transparent Area
16	Slide Panel
17	Grip
18	Bracket
20	Guide Element
22	Guide Element
24	Guide Rail
26	Floor
28	Hinge
30	Latch
32	Rail Piece
34	Axis
36	Stopper Part